Exemption No. 8067

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Fokker Services B.V.

for an exemption from § 25.365(e) of Title 14, Code of Federal Aviation Regulations

Regulatory Docket No. FAA-2003-15300

GRANT OF EXEMPTION

By letter of May 27, 2003, Mr. Ron Huisman, Office of Airworthiness, Technical Services, Fokker Services B.V., Lucas Bolsstraat 7, 2152 CZ Nieuw-Vennep, The Netherlands, petitioned for a temporary exemption from the decompression requirements of § 25.365(e) of Title 14, Code of Federal Aviation Regulations (14 CFR). The proposed exemption, if granted, would allow Fokker Services until July 31, 2003, in which to show full compliance with the subject regulations for the reinforced flight deck door installation on one (1) Fokker F28 aircraft, serial number 10227, US registration N478US. By letter of June 6, 2003, the petitioner submitted a revised request correcting the aircraft serial number and US registration number to 11227 and N159AD, respectively.

The petitioner requests relief from the following regulations:

> **Section 25.365(e)**, as amended by Amendment 25-0, requires "If a pressurized cabin has two or more compartments separated by partitions, bulkheads, or floors, the structure supporting the prescribed flight and grounds loads (and any other structure that, if it failed, could interfere with continued safe flight and landing) must be designed to withstand the effects of sudden release of pressure in any compartment through an opening resulting from the failure or penetration of an external door, window, or windshield panel, or from structural fatigue or penetration of the fuselage in this compartment, unless it is shown that the probability of failure or penetration is extremely remote."

The petitioner's supportive information is as follows:

"Description
Due to relatively late ordering as well as late recognition of the necessity of such decompression provisions (as a result of the uncertainty on the precise way compliance was demonstrated during Type Certification of the Fokker F28 in the sixties), retro-modification with decompression provisions of the already frozen design of the re-inforced flightdeck door itself, was not considered realistically possible within the time-frame as originally set by the US FAA, April 9, 2003, or before the start of revenue operation date of the aircraft involved (expected end of June, 2003). With a separate modification of the radio rack backwall, the timely production, delivery and installation of the re-inforced flightdeck door modkits to those operators that ordered the modification would not be endangered. This approach therefore enables compliance with the security aspects of the FAR 121.313 amendment 121.288 (and similar regulation in other countries) in the above-mentioned time-frame.

"However, as a direct consequence, Fokker Services will not be able to deliver the separate modkits for the radio rack in time to completely meet the decompression aspects of the same regulations before start of revenue operation with the re-inforced flightdeck door. The F28 aircraft involved will therefore need to be granted a temporary exemption for full compliance with the decompression requirements (while fully meeting all other relevant requirements). This specifically concerns decompression resulting from the loss of a windshield on the flightdeck.

"Regulations
This temporary exemption, when granted, would in practice extend the situation that already existed from the date of the initial SFAR 92 regulations regarding provisionally re-inforced flightdeck doors, October 2001, until April 9, 2003. During that period a general waiver was in force with respect to the decompression requirements, provided that the airline would show the airworthiness consequences of such formal non-compliance to (the satisfaction of) the FAA .

"The recently issued SFAR 92-5 extends this situation for aircraft in service and before midnight April 9, 2003 equipped with a re-inforced flightdeck door meeting the intrusion and ballistic requirements, until July 31, 2003 provided formal application for certification was submitted before March 10, 2003. While these conditions can not literally be met by the F28 aircraft that is now planned to be equipped with the re-inforced flightdeck door, Fokker Services feels that the extension provisions of SFAR 92-5 can serve as an example for authority handling of a specific request for approval of temporary non-compliance with FAR 25.365 (e) at amendment 22, which is the original certification basis of the F28 aircraft.

"To that intent this document provides the necessary substantiation of an acceptable delay (until July 31, 2003 at the latest) of incorporation of these decompression provisions based on a probability assessment of the loss of a windshield in an assumed non-compliance period of 3 months or 750 flight cycles."

"Substantiation for temporary exemption

1. What is the probability of a full windshield loss (assumed to lead to the loss of the aircraft if equipped with the re-inforced flightdeck door) ?

   Facts & assumptions:

   - There have been five (5) rapid decompression events due to flightdeck windshield failures in worldwide service experience of all transport category aircraft types since about 1950, ref. the document attached to the e-mail with which this document was sent.
   - Worldwide service experience of all transport category aircraft types since about 1950 equals about 750×10^6 flights.
   - Windshield failure is assumed to happen at maximum cabin pressure differential.
   - The effect of a full windshield loss at maximum cabin pressure differential is assumed to lead to the loss of the aircraft if the aircraft is equipped with the re-inforced flightdeck door.
   - For reasons of due conservatism (possibility of some events not included in the above mentioned document), the quantitative assessment is based on 10 events in 10^9 flights.

   The above leads to a catastrophic event probability of 1×10^{-8} per flight cycle.

2. What would be an acceptable period for this assumed catastrophic risk to remain present on the (very limited number of) aircraft to be modified in the period considered?

   Concept JAA rules (JAR 39) accept an AD related chance of an accident which is 25% of the JAR/FAR 1309 maximum determined risk (failure rate) of 10^{-7} for the sum of 10 specific catastrophic failure modes in 10 systems. These concept JAA rules are based on 10 AD situations per 40000 flight cycles. Considering 20 AD situations on an aircraft life of 80000 FC (which is considered more realistic) this results in an equally distributed acceptable risk of:

   $0.25 \times 10^{-7} \times 80000 / 20 = 1 \times 10^{-4}$ per AD.

   Comparing the risk of a catastrophic event during the assumed non-compliance period of 3 months or 750 flight cycles with the above AD approach, we get the following:

   - Compliance extension for F28 decompression provisions: $1 \times 10^{-8} \times 750 = 0{,}75 \times 10^{-5}$
   - Widely accepted risk during single AD compliance periods: 1×10^{-4}

   Based on these figures (demonstrating a more than an order of magnitude less critical situation than usually is accepted in AD situations), the assumed additional non-compliance period of 3 months or 750 flight cycles is considered acceptable. The more so since:

- Only 3 aircraft, of which one on US register, are expected to be equipped with the re-inforced flightdeck door before installation of the associated radio rack decompression provisions, whereas the 1 x 10^{-4} figure for AD situations is based on a possible deficiency in the whole fleet of a certain aircraft type. Thus already with a fleet size as small as 30 aircraft (while actually there are still over 150 F28 aircraft in operation) the additional risk on these 3 aircraft averaged over the fleet shrinks to less than the FAR 25.1309 design target for a single catastrophic failure mode.
- The much longer period during which similar risks were already accepted by the FAA and other authorities under the initial SFAR 92 and equivalent regulations."

Notice and Public Procedure

> The FAA finds that action on this petition need not be delayed by Federal Register publication and comment procedures because those procedures would significantly delay issuance of the design approval and delivery of the affected airplane.

The Federal Aviation Administration's analysis/summary is as follows:

The FAA has considered the information provided by the petitioner, and has determined that there is sufficient merit to grant a temporary exemption.

Title 14 Code of Federal Regulations (CFR) § 25.365(e) at Amendment 25-0 requires that the airplane be designed to withstand the effects of a sudden release of pressure from the failure of a windshield panel, unless it is shown that the probability of that failure is extremely remote. While the use of probability is technically allowed, compliance has typically been shown with the assumption that the windshield blowout and resulting decompression event occurs.

For this decompression event, it was considered that the flightdeck door would open, thereby preventing the rise of pressure induced loads which could exceed the capability of the surrounding structure. With the installation of the reinforced flight deck door, the Fokker F28 no longer complies with this decompression criterion until further modifications can be installed.

In considering this petition for exemption, it is appropriate to consider the probability of the windshield blow out and resulting decompression event. The FAA agrees with the Fokker assessment that the probability of such an event on this one airplane, during the specified timeframe, is extremely low.

The granting of this exemption is also in accord with the relief granted under Special Federal Aviation Regulation (SFAR) No. 92-5. Under the provisions of this SFAR, certain airplanes modified with reinforced flight deck doors are allowed to operate without regard to decompression and other applicable requirements until July 31, 2003. While the Fokker F28 airplane is not covered under this SFAR, the effect of the SFAR and this exemption would be the same.

Section 7 of the SFAR identifies three criteria that must be met for an airplane to be eligible for this relief:

a. Before midnight, April 9, 2003, the operator must have installed a strengthened flightdeck door meeting the requirement of paragraph 7.b;

b. Before midnight, April 9, 2003, the FAA must have found that the door complies with 14 CFR 25.795(a)(1) and (2) in effect on January 15, 2002 [the reinforcement requirement]; and

c. Before March 10, 2003, a formal application for certification approval of the door must have been submitted to the FAA.

The reason for these criteria was stated in the preamble to the SFAR: "these criteria should assure that operators and door producers have made a good faith effort to meet the reinforced door requirement." Based on the information provided by the petitioner, we have no reason to find that there was any lack of good faith that resulted in the failure to meet these criteria in this case. The subject airplane has not been operating in revenue service and, therefore, was not subject to the original April 9 deadline.

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, Fokker Services B.V. is granted a temporary exemption from the decompression requirements of § 25.365(e) for one Fokker F28 airplane, serial number 11227, US registration N159AD, until July 31, 2003.

Issued in Renton, Washington, on June 6, 2003.

/s/ Vi Lipski
Manager
Transport Airplane Directorate
Aircraft Certification Service, ANM-100